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(54) REPRODUCING APPARATUS AND METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To reproduce digital image data, which is recorded in a letter box mode and squeeze mode, in a correct state.

SOLUTION: In a reproducing apparatus, correction information on aspect ratio correction such as letter box mode, and squeeze mode is multiplexed into digital information as PSM information. A PSM-detecting circuit 40 detects the PSM information from a bit stream to output it to a control circuit 6. The circuit 6 generates a signal for controlling a horizontal-vertical filter in a display 18 by a signal generator 51, in response to the inputted PSM information and modulates the signal into vertical blanking sections by a D/A converter 17 to transmit an attribute indicting the letter box mode or squeeze mode to the display 18, so that the display 18 places a corresponding filter in operation to display an image in the correct state.

LEGAL STATUS

CLAIMS

[Claim(s)]
[Claim 1] In the regenerative apparatus which reproduces the digital data recorded on the record medium A separation means to separate the image formal information on a video data and said video data, and the copy control information of said video data from a playback means to reproduce said digital data from said record medium, and said reproduced digital data, A decode means to decode said separated video data, and a generation means to generate the video signal which has a blanking period based on said decoded video data, The regenerative apparatus characterized by having a superposition means to superimpose additional information on said blanking period, according to said image formal information and copy control information.
[Claim 2] Said additional signal is a regenerative apparatus according to claim 1 characterized by including the combination of the information which shows each contents of control in the signal which shows the classification of image formal information and copy control information at least, and a list.
[Claim 3] Said image formal information and copy control information are a regenerative apparatus according to claim 2 characterized by being superimposed at the same blanking period.
[Claim 4] Said image formal information is a regenerative apparatus according to claim 2 characterized by including the information which shows an aspect ratio.
[Claim 5] Said image formal information is a regenerative apparatus according to claim 2 characterized by including the information which shows that display form is a letter

box format.
[Claim 6] Said copy control information is a regenerative apparatus according to claim 2 characterized by including the information which shows a generation limit of a copy.
[Claim 7] In the playback approach of the regenerative apparatus which reproduces the digital data recorded on the record medium Reproduce said digital data from said record medium, and from said reproduced digital data The image formal information on a video data and said video data and the copy control information of said video data are separated. The playback approach characterized by decoding said separated video data, generating the video signal which has a blanking period based on said decoded video data, and superimposing additional information on said blanking period according to said image formal information and copy control information.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially this invention relates to the regenerative apparatus and approach which enabled it to display the image data recorded [has been created and] and transmitted by different aspect ratio by the right aspect ratio about a regenerative apparatus and an approach.
[0002]
[Description of the Prior Art] The television broadcasting of our country is performed by NTSC system, and the standard aspect ratio is set as 4:3. Therefore, the display of an old television receiver, a monitoring device, etc. had many which are set as the aspect ratio of 4:3. However, that by which the television receiver is also set as the wider aspect ratio of 16:9, and the so-called wide television are spreading recently with the spread of the high-definition television broadcasting represented by the Hi-Vision which has the aspect ratio of 16:9.
[0003] Moreover, it follows on it and the image source created and broadcast also consists of aspect ratios of wider 16:9 and others.
[0004] He amends an aspect ratio and is trying to transmit such 16:9 and the image data which consists of screens of other aspect ratios, as shown in <u>drawing 46</u> so that it can display also on the display of the aspect ratio of 4:3.
[0005] <u>Drawing 46</u> (A) expresses the screen which has the aspect ratio of 4:3. The image data of this screen is transmitted as it is. On the other hand, as shown in this drawing (B), after adding a blacking wash part (non-image part) to the edge of the upper and lower sides of the screen and setting the whole aspect ratio as the screen of 4:3, he is trying to transmit the image data of the screen of the aspect ratio of 14:9

in letter box mode. Or the image data of the screen of the aspect ratio of 14:9 compresses the screen horizontally, and changes it into the image data of the screen of the aspect ratio of 4:3, and he is trying to transmit it in squeeze mode, again, as shown in this drawing (E).

[0006] Moreover, in letter box mode, the image data of the screen of the aspect ratio of 16:9 adds a blacking wash part (non-image part), and as the whole aspect ratio serves as a screen of 4:3, it is transmitted to the edge of the upper and lower sides of the screen of 16:9, drawing 46 (C) So that it may be shown. The width of face of the blacking wash part in this case becomes thicker than the case of the aspect ratio of 14:9 in drawing 46 (B).

[0007] Moreover, in squeeze mode, as shown in this drawing (F), horizontally, an image is compressed and the image data of a screen which has the aspect ratio of 16:9 is transmitted so that it may become the screen of the aspect ratio of 4:3.

[0008] Furthermore, as shown in drawing 46 (D), in letter box mode, the blacking wash part of width of face still thicker than the case of the screen which has the aspect ratio of 16:9 is added up and down, and the image data of the screen of SHINESUKO of about 2:1 aspect ratio is made as [transmit], after being amended so that the whole aspect ratio may be set to 4:3.

[0009] Furthermore, where a longitudinal direction is compressed to be shown in drawing 46 (G) since it cannot be set as the aspect ratio of 4:3 yet even if it compresses horizontally at the rate of the compression ratio which the screen of SHINESUKO which has about 2:1 aspect ratio is in squeeze mode, and is changed into 4:3 from 16:9, a blacking wash part is further added to the edge of the upper and lower sides of a screen, and it is transmitted. In the display of the aspect ratio of 4:3, it is received as it is and these images are displayed.

[0010] On the other hand, the display (television receiver) 80 whose aspect ratio is 16:9 is constituted as shown in drawing 47 . That is, the video signal inputted through the antenna, the cable, etc. is made as [display / through the horizontal filter 82 and the perpendicular direction filter 83 / on CRT85 which has the aspect ratio of 16:9 / output and], after getting over in the television signal demodulator circuit 81. The controller 84 is made as [operate / the horizontal filter 82 or the perpendicular direction filter 83] corresponding to the command from a user inputted from the remote commander which is not illustrated.

[0011] That is, as shown in drawing 48 (A), when the recovery output of the image (Normal image) of the usual aspect ratio of 4:3 is carried out from the television signal demodulator circuit 81 for example, a user operates a remote commander, turns on the horizontal filter 82, and makes the perpendicular direction filter 83 turn off. Thereby, as shown in drawing 48 (D), a blacking wash part (non-image part) is added and displayed on CRT85 which has the aspect ratio of 16:9 by the right-and-left edge of the effective image field of the aspect ratio of 4:3.

[0012] When the data in the letter box mode shown in drawing 48 (B) are received, a

user operates a remote commander, turns off the horizontal filter 82, and makes the perpendicular direction filter 83 turn on. At this time, the perpendicular direction filter 83 performs processing which starts only the part of the effective image field which has, original, for example, the aspect ratio of 16:9, except the blacking wash part added to the up-and-down edge. Thereby, as shown in drawing 48 (E), the screen of the aspect ratio of 16:9 is normally displayed on CRT85.

[0013] On the other hand, as shown in drawing 48 (C), when the image processed in squeeze mode has been transmitted, a user operates a remote commander and makes both the horizontal filter 82 and the perpendicular direction filter 83 turn off. Consequently, as shown in drawing 48 (F), the screen of the aspect ratio of 16:9 is normally displayed on CRT85.

[0014] Thus, if a switch of the horizontal filter 82 and the perpendicular direction filter 83 is controlled by manual operation, operability will worsen by it. Then, for example, the amendment information corresponding to the amendment mode of an aspect ratio is transmitted to the perpendicular blanking period of the television signal transmitted, this is separated in the television signal demodulator circuit 81, and there is also a television receiver it was made to output to a controller 84.

[0015] In this case, a controller 84 controls a switch of the horizontal filter 82 and the perpendicular direction filter 83 not only corresponding to the command from a remote commander but corresponding to the signal from the television signal demodulator circuit 81. If it does in this way, it will become unnecessary for a user to not necessarily perform manual operation, and operability will be improved.

[0016]
[Problem(s) to be Solved by the Invention] However, the approach of inserting such amendment information on Rhine predetermined [in a perpendicular blanking period] had an inapplicable technical problem, when an image was digitized and was transmitted or recorded.

[0017] That is, when digitizing and transmitting a video signal, the data in a blanking period are prescribed not to substantial almost be transmitted or recorded on specification, since it is the unnecessary section. Consequently, even if it inserts amendment information during a perpendicular blanking period, this amendment information will be deleted, when digitizing and transmitting or recording.

[0018] Furthermore, for example, as the insertion point (if it puts in another way arrangement location of an effective image field) of the blacking wash part in letter box mode is shown in drawing 49 , three change is possible. This drawing (A) is the case where the effective image field has been arranged at the core (center), this drawing (B) is the case where it has arranged to the up side (top), and this drawing (C) is the case where it has arranged to the down side (bottom).

[0019] Furthermore, drawing 50 is drawing showing examples of a display, such as a title or a LOGO, and a notation. When indicating the title (ABC) by superposition to the image in the letter box mode shown in this drawing (A), as are shown in this

drawing (B), and it is indicated in this drawing (C) as the case where it arranges in an effective image field, it may arrange into a blacking wash part. Moreover, as shown in this drawing (D), various kinds of patterns, such as not only a title but a LOGO, a mark, a notation, etc., may be indicated by superposition at a blacking wash part.

[0020] Since it is specified that it inserted and transmits the information about display positions, such as a display position of these effective image fields, a title, a LOGO, and a notation, etc. on Rhine predetermined [in a perpendicular blanking period] in analog broadcasting, it can use, when such information also digitizes a video data and transmits or records it.

[0021] This invention is made in view of such a situation, and when digitizing and transmitting a video signal, it enables it to use amendment information etc.

[0022]

[Means for Solving the Problem] A playback means by which the regenerative apparatus of this invention reproduces digital data from a record medium, A separation means to separate the image formal information on a video data and a video data, and the copy control information of a video data from the reproduced digital data, A decode means to decode the separated video data, and a generation means to generate the video signal which has a blanking period based on the decoded video data, It is characterized by having a superposition means to superimpose additional information on a blanking period, according to image formal information and copy control information.

[0023] Said additional signal can include the combination of the information which shows each contents of control in the signal which shows the classification of image formal information and copy control information at least, and a list.

[0024] Said image formal information and copy control information can be superimposed at the same blanking period.

[0025] Said image formal information can include the information which shows an aspect ratio.

[0026] Said image formal information can include the information which shows that display form is a letter box format.

[0027] Said copy control information can include the information which shows a generation limit of a copy.

[0028] The image formal information on a video data and a video data and the copy control information of a video data are separated from the reproduced digital data, the playback approach of this invention decodes the separated video data, and digital data is reproduced from a record medium and it is characterized [it generates the video signal which has a blanking period based on the decoded video data, and] by superimposing additional information on a blanking period according to image formal information and copy control information.

[0029] In the regenerative apparatus and approach of this invention, a video data, image formal information, and copy control information are separated from digital data.

According to image formal information and copy control information, it is superimposed on additional information at a blanking period.

[0030]

[Embodiment of the Invention] In the example of this invention, it is multiplexed and transmitted to the digital image data which compressed the amendment information about amendment of aspect ratios, such as squeeze mode or letter box mode, at least, and amended the aspect ratio (record). Then, the transmission approach of this amendment information and the additional information added to other video signals is explained first.

[0031] As specification which transmits additional information, CPX-1202 and CPX-1204 are specified in EIAJ (Electronic Industries Association of Japan).

[0032] According to CPX-1202 specified as "the recognition signal and its transmission approach" of the video signal with which aspect ratios differ, the approach of superimposing the direct current voltage of predetermined level on the switch terminal which outputs a video signal as a recognition signal is specified. It is made to change suitably corresponding to the amendment information on the digital image data which follows, for example, transmits the value of this direct current voltage to superimpose (for example, at the time of letter box mode). It is what the value of the direct current voltage to superimpose is set to 3V, and it is referred to as 5V at the time of squeeze mode, and is set to 0V when other. It can specify whether the aspect ratio was amended in that the image data had the aspect ratio amended in letter box mode, or squeeze mode. Amendment control of an aspect ratio is performed corresponding to the value of the direct current voltage on which this switch terminal is overlapped at the reception and playback side.

[0033] Coding and transmitting the 20-bit recognition signal of a signal wave form as shown in <u>drawing 1</u> to the 20th line of the perpendicular blanking period of the luminance signal of NTSC system and the 283rd line on the other hand in CPX-1204 (common-name ID-1, video ID) specified as "the recognition signal and its transmission approach (II)" of the video signal with which aspect ratios differ is specified. That is, from the negative going edge of a Horizontal Synchronizing signal, the Ref signal used as criteria is arranged by 2.232microsecond**20ns width of face, in a 11.2microsecond**0.6microsecond location, spacing of the still more nearly same width of face is set, and the 20-bit same data of the bit (bit) 1 of width of face thru/or a bit (bit) 20 are arranged by the same width of face in it.

[0034] This 20-bit data consists of WORD2 of 1 or 4 bits of WORD of 0 or 4 bits of 6-bit WORD, and 6-bit CRC, as shown in <u>drawing 2</u> . And WORD0 is further constituted by WORD0-A of a triplet, and WORD0-B of a triplet.

[0035] The fundamental parameter which makes a key objective automatic control by the side of a receiver is set to WORD0, and the identification information about a video-signal transmission format is arranged at WORD0-A, as shown in <u>drawing 3</u> .

[0036] That is, when the aspect ratio of the image data to transmit is 16:9, 1 is set

(when it is in full mode), and 0 is set to the bit 1 of WORD0-A when it is 4:3. Moreover, when an image display format is a letter box, 1 is set up, and when normal, 0 is set to a bit 2.

[0037] It is supposed at WORD0-B that the identification information about other signals (for example, sound signal etc.) transmitted to coincidence along with an image and an image can be arranged.

[0038] The recognition signal, information, etc. that the recognition signal subordinate to WORD0 is subordinate to WORD0 again at WORD2 are made as [arrange /, respectively] by WORD1. The CRC code is an error-checking code, term type G (X) besides generation is set to X6+X+1, and all presetting is set to 1.

[0039] Although CPX-1204 are defined as a recognition signal for television of NTSC system, i.e., a 525-line system, in Europe, WSS (Wide Screen Signaling) specification for the recognition signal of the PAL television system of a 625-line system and a SECAM television system is going to be similarly enacted in ETSI (European Telecommunication Standards Institute).

[0040] This WSS is prescribed that a 14-bit recognition signal is coded and transmitted to the 23rd line of a PAL signal as shown in <u>drawing 4</u> . Start with which Run-in for generating a clock to the beginning of the 23rd line expresses initiation of a code to the degree as shown in this drawing 833kHz data [14-bit] are arranged at Code and its degree.

[0041] As shown in <u>drawing 5</u> , aspect ratio information is made by a group's 1 bit which consists of 4 bits of the beginning of the 14 bits as [arrange / subtitle information / PALplus related information is arranged at the 4-bit group 2 as follows, and / at the bit of the group 3 of the following triplet /, respectively], and let the group 4 of the last triplet be an undefined.

[0042] As one groupb3 thru/or 4 bits of b0 show a detail to <u>drawing 6</u> by taking a predetermined value, aspect ratio information is set up. For example, when 4 bits is 1000, this expresses that an aspect ratio is 4:3 and is the image of Normal (full format). Moreover, 0001 is the image of the letter box of the aspect ratio of 14:9, and it expresses that the location of the effective image field is a center (center).

[0043] Moreover, it expresses that 0010 is what the image of the letter box of the aspect ratio of 14:9 is displayed on the top's location as.

[0044] In addition, as it is indicated in <u>drawing 7</u> (A) and (<u>drawing 49</u> (A)) as the display of the center of a letter box That a substantial image (effective image field) is arranged in the center of a screen, and displays a blacking wash part (non-image part) on the edge of the upper and lower sides with the top's [express] display As shown in this drawing (B) and (<u>drawing 49</u> (B)), it means displaying a substantial image (effective image field) on the upper part (top) of a screen, and displaying a blacking wash part on the lower part of a screen.

[0045] <u>Drawing 8</u> expresses the more detailed range of the aspect ratio of <u>drawing 6</u> . That is, 1000 [4-bit] of <u>drawing 6</u> is having the case where the value a is 1.46 or

less meant, when the aspect ratio of A:B is expressed in a (= A/B) as the aspect ratio of 4:3 as shown in drawing 8 although 0001 expresses the aspect ratio of 14:9 for the aspect ratio of 4:3 and 1011 expresses the aspect ratio with 1101 [bigger (> 16:9)] than 16:9 for the aspect ratio of 16:9, respectively. Moreover, the aspect ratio of 14:9 means the case where a is 1.66 or less more greatly than 1.46, and the aspect ratio of 16:9 means that a is 1.90 or less more greatly than 1.66, and it means the case where a of a bigger aspect ratio than 16:9 is a bigger value than 1.90.

[0046] Moreover, among 4 bits of the group 2 of drawing 5 , a bit 4 expresses camera mode, when it is 0, and when it is 1, it expresses that it is in film mode. That is, 0 expresses the case where it is the image captured from the usual television camera, and it expresses that 1 is the image changed from films, such as a telecine, etc.

[0047] Drawing 5's bit 5 thru/or bit 7 of a group 2 is made intact.

[0048] 0 means that there is no title in a teletext, and a group's 3 bit 8 means that a title has 1 in a teletext, as shown in drawing 10 .

[0049] Furthermore, it means that there is no title when it is 00, as shown in drawing 11 , a group's 3 bit 9 and bit 10 mean that a title is in a screen (effective image field) when it is 10, and when it is 01, that there is a title expresses them with the blacking wash part. 11 is made intact.

[0050] The example of a display in the case where a title is located in a screen (effective image field), and the case of being located in a blacking wash part is shown in drawing 7 .

[0051] In addition, corresponding to the aspect ratio information on WSS shown in drawing 6 , the bit 1 and bit 2 of WORD0−A of CPX−1204 which were shown in drawing 3 can be set up automatically. For example, in drawing 6 , when it is 0111, the bit 1 of drawing 3 is set to 1, other than this, drawing 6 solves and the bit 1 of drawing 3 is set to 0. Moreover, when 4 bits of drawing 6 are 0001, 0010, 1011, 0100, or 1101, the bit 2 of drawing 3 is set to 1, and when 4 bits of drawing 6 are 1000, 1110, or 0111, the bit 2 of drawing 3 is set to 0.

[0052] In addition, the escape is discussed about the above−mentioned CPX−1204 recently (this is hereafter called extended CPX−1204). In these extended CPX−1204, as shown, for example in drawing 12 , WORD2 and 6 bits of the last are set [2 bits of the beginning of the 20 bits / WORD0 and the following 4 bits] to CRC for WORD1 and the following 8 bits.

[0053] As shown in drawing 13 , the identification information about a video−signal transmission format is arranged at WORD0. When the bit 1 of WORD0 is 1, it means that an aspect ratio is in full mode (squeeze mode) of 16:9, and 0 means that an aspect ratio is 4:3. Moreover, 1 of the bit 2 of WORD0 means that an image display format is a letter box, and 0 means the normal thing.

[0054] Thus, WORD0 in drawing 12 is defined as maintaining the part and compatibility of bit 1 and 2 of WORD0−A in drawing 2 .

[0055] Furthermore, the header which specifies the information transmitted by

WORD2 as shown in underline drawing 14 is expressed, for example, when 4 bits of the bit 3 thru/or a bit 6 are 0000, WORD1 expresses that WORD2 is digital copy information, it expresses that 0001 is the information about an image format, and expresses that 0010 is title positional information.

[0056] WORD2 expresses the data specified by the header of WORD1, WORD1 is 0000, and when digital copy information is expressed, contents as shown in drawing 15 are specified by 8 bits of the bit 7 of WORD2 thru/or a bit 14. That is, in this example, only a bit 7 and a bit 8 are specified substantially and the table of CGMS-A (Copy Generation Management System-Analogue Interface) shown in drawing 16 is specified by whether a bit 7 and a bit 8 are [0] 1. When the value of bits 7 and 8 is 00, this expresses a copy free-lancer and is made intact [01], 10 expresses permission of one copy and 11 expresses prohibition of a copy, respectively.

[0057] Furthermore, when WORD1 is the information about the image format which is 0001, WORD2 is specified as shown in drawing 17 . That is, the screen size shown in drawing 18 is prescribed by bits 7 and 8, and the screen location shown in drawing 19 is specified from bits 9 and 10.

[0058] Moreover, the bit 11 of WORD2 means that there is a title in a non-picture area (blacking wash part), when it is 1, and it means that 0 does not have a title.

[0059] As shown in drawing 18 , when it is 01, it considers as the letter box of 14:9, when a bit 7 and a bit 8 are 00, it is set to 4:3, a screen size is used as the letter box of 16:9 when it is 10, and when it is 11, let it be a SHINESUKO letter box.

[0060] Furthermore, as shown in drawing 19 , a screen location is used as a center when bits 9 and 10 are 00, and when it is 01 or 10, it is made into a top or the bottom, respectively. 11 is made intact.

[0061] Furthermore, it expresses whether the display position of the effective image field containing the title shown in a bit 8 thru/or a bit 14 is the information about the upper limit of a screen, and whether when WORD1 is the effective image region information containing the title of 0010, as it is shown in drawing 20 , the bit 7 of WORD2 is the information about the lower limit of a screen, expresses that 1 is upper limit, and expresses that 0 is a lower limit.

[0062] Moreover, the value of 0 thru/or 127 expressed by 7 bits of the bit 8 of WORD2 thru/or a bit 14 expresses the number of Rhine from the upper limit of the screen of the maximum upper limit (or the lowest edge) of the effective image field containing a title, as shown in drawing 22 . For example, a bit 7 is 1 and the maximum upper limit of the effective image field which contains the title when the value expressed by a bit 8 thru/or 14 is 0 expresses what it is displayed on the 22nd Rhine from the upper limit of a screen, and is displayed on the 24th Rhine from the upper limit of a screen when the value expressed by a bit 8 thru/or 14 is 2. Moreover, Rhine of the maximum upper limit of the effective image field which contains the title when a bit 7 is 0 and the value expressed by a bit 8 thru/or 14 is 0 is the 262nd line, and it expresses that Rhine of the maximum upper limit of the effective image field

containing the title is the 260th line when the value expressed by a bit 8 thru/or 14 is 2.

[0063] In addition, when transmitting this WORD1 (= 0010), it is transmitted twice or more in 2 seconds at least.

[0064] Moreover, in the U.S., additional information, such as aspect ratio information on an image, can be transmitted also by XDS (Extended Data Services) (the old abbreviated name EDS) specified by EIA−608 other than the same method as CPX−1204. In this XDS, it is made as [insert / with parity / in the 21st line of an NTSC television signal, and the 284th line / a 16−bit signal], and thereby, as shown in drawing 23 , it is made as [transmit / the location of an effective image field and discernment of squeeze mode or normal mode]. 5 bits of S0 shown in drawing 23 thru/or S5 express the starting line of an effective image field, and 5 bits of E0 thru/or E5 express termination Rhine of an effective image field. Moreover, at the time of squeeze mode, Q0 is set to 1 and Q0 is set to 0 at the time of normal mode.

[0065] Drawing 24 and drawing 25 express such title positional information and its operation typically. For example, as shown in drawing 24 , head Rhine of an effective image field is expressed by S0 thru/or S5, and termination Rhine is expressed by E0 thru/or E5. And when Rhine of the lowest line of a title (ABC) is known, Rhine from the top line of a usual picture area field to the lowest line of a title is started with a perpendicular filter etc., and can be displayed.

[0066] Moreover, as shown in drawing 25 , the blacking wash part is added to both an effective image field top and the bottom, and when the top line of an upper title and the lowest line of a lower title are known in the condition that the title is displayed on the blacking wash part, the range from the top line of an upper title to the lowest line of a lower title is started with a perpendicular filter, and can be displayed, respectively. It becomes possible to display completely, without not only an effective image field but also a title being missing if it does in this way.

[0067] In this example, although compress data for the recognition signal defined by the above specification by the MPEG method, and it multiplexes and transmits to the digital image data which amended the aspect ratio, and this is received, or it records on a record medium in a receiving side and this is reproduced in a regenerative apparatus next, a format of transmission (record) is explained.

[0068] Drawing 26 expresses the thing illustrating a format (Syntax) of a program stream (MPEG 2 system stream). As shown in this drawing, a program stream consists of n packs (pack), and the pack header (pack header) is arranged at the head of each pack. Each pack is pack. start code, SCR, program mux rate, pack stuffing length, packstuffingbyte, etc. are arranged and also it is system further. header is followed and it is PES. Sequential arrangement of the packet is carried out.

[0069] system In header, it is system. header startcode, header length, rate bound etc. is arranged.

[0070] It is stream further again. id, P_STD, buffer boundscale, P_STD, buffer size

bound etc. is arranged.

[0071] The example of the bit stream which multiplexed according to Syntax shown in drawing 26 is shown in drawing 27 (A). That is, as shown in drawing 27 (A), the video packet, the subtitle packet, the audio packet, etc. are made as [transmit / a packet / as a unit]. And when recorded on a disk, it is made as [record / a sector / as a unit].

[0072] Each packet is constituted by a packet header and packet data as shown in drawing 27 (B). Although it is not shown in a picture header, a picture coding extension, and a list as an example for example, at picture data and drawing 27 (C) as shown at drawing 27 (C) if that packet is a video packet, group picture ZUHEDDA, a sequence header, a sequence end code, etc. will be contained in this packet data.

[0073] Let the sector of the video packet which contains the data of I picture among this picture data be an entry sector. And the pack headers PSD (Program Stream Directory) and PSM (Program Stream Map) are arranged at this entry sector. That is, a program stream map (PSM) is arranged just before I picture.

[0074] When the configuration of an entry sector is expressed collectively, it comes to be shown in drawing 28 . That is, in an entry sector, it is pack. header is arranged at the head and it is system as an option here. header is arranged. And PSD and PSM are arranged at the degree and other packets are arranged further at the degree.

[0075] Drawing 29 expresses the thing illustrating a format (Syntax) of a program stream map (PSM). In the head, it is 24 bytes of packetstart. code prefix is arranged and it is 8 bytes of map in the degree further. stream id is arranged and it is programstream to the degree further. map length is arranged. Furthermore in the degree, it is current. next indicator etc. is arranged.

[0076] Drawing 30 expresses Syntax of PSM shown in drawing 29 . The inside of drawing and bslbf are bit. string left bit Expressing first, uimsbf is unsigned. interger msb first is expressed. Moreover, rpchof is remainder. polynomial coefficients highest order first is expressed.

[0077] PSM of this drawing 30 Syntax of global_descriptors() in Syntax is shown in drawing 31 . Moreover, elementary in drawing 30 stream Syntax of descriptors is shown in drawing 32 .

[0078] elementary shown in this drawing 32 stream descriptors Various kinds of delimiters are described so that it may mention later with reference to drawing 34 to dvd_video_descriptor() in Syntax, but as desriptor_tag of this dvd_video_descriptor(), it is added so that 0xdf may be defined by drawing 33 . In addition to this, Tag of various kinds of descriptor(s) is expressed to drawing 33 . Each descriptor will be identified by this Tag.

[0079] Moreover, as shown in drawing 33 , dvd_video_descriptor() is uniquely prescribed by the specification of DVD (Digital Video Disk).

[0080] Drawing 34 expresses Syntax of dvd_video_descriptor().

[0081] In drawing 34 , descriptor_tag is tag for identifying this dvd_video_descriptor,

and as explained with reference to drawing 33 , 0xdf is described here.

[0082] descriptor_length expresses the die length of this dvd_video_descriptor.

[0083] It encodes, respectively and horizontal_size and vertical_size express with the unit of the number of pixels the size of the horizontal direction and perpendicular direction of image data currently recorded (transmission).

[0084] Moreover, display_horizontal_size and display_vertical_size express the die length and the vertical die length with a rectangular horizontal field which it is going to display, respectively. When smaller than the field of the image with which the field of this rectangle is encoded, in display processing, it is made as [display / some coded images]. On the contrary, when larger than the field of the image with which the field of this rectangle is encoded, in display processing, a playback image is displayed on some displays (a blacking wash part is added to the remaining fields).

[0085] It is a flag showing whether film_or_camera_flag changes the image of a film into a video signal for whether the image incorporates from a camera in WSS, as explained with reference to drawing 9 .

[0086] closed_gop_flag will be set to 0, if the GOP (Group of Picture) is not referring to the last GOP, and it is referred to as 1 and it is referring to.

[0087] still_picture_flag is a flag showing whether it is an image between the first still picture and the last still picture, when displaying a predetermined period still picture.

[0088] edge_crop_flag is a flag showing whether the display in edge crop mode (with reference to drawing 44 , it mentions later) is forbidden.

[0089] aspect_ratio_code is specified as shown in drawing 35 . Namely, as for 0000 of the value, the use is forbidden. Moreover, 0001 of the value expresses that the aspect ratio of each pixel which constitutes an image is 1:1, and, as for 0010, in 4:3 and 0011, the display aspect ratio expresses that 16:9 and 0100 are 2.21:1.

[0090] frame_rate_code is specified as shown in drawing 36 . That is, as for 0000 of the value, use is forbidden, and 0001 expresses that the frame rate (frame frequency) of a video signal is 23.976Hz. Moreover, in 0010, 24Hz and 0011 express 25Hz and 0100 expresses 29.97Hz. Furthermore, in 30Hz and 0110, 50Hz and 0111 express 59.94Hz and 1000 expresses [0101] 60Hz, respectively.

[0091] wss_aspect_ratio_code expresses a group's 1 4-bit aspect ratio information shown in drawing 5 , and wss_subtitles_within_teletext_flag expresses the flag (namely, flag shown in drawing 10) showing the existence of the teletext title of a bit 8 of the subtitle information on the triplet of the group 3 of drawing 5 .

[0092] In addition, in case CPX-1204, WSS, extended CPX-1204, etc. are generated, it is also possible to use aspect_ratio_code shown in drawing 35 instead of wss_aspect_ratio_code.

[0093] Moreover, wss_subtitling_mode expresses the mode (namely, mode shown in drawing 11) of a title location in which it is expressed with the bit 9 of the subtitle information on the triplet of the group 3 of drawing 5 , and a bit 10.

[0094] The data of digital copy information [in / in cgms_a_code / extended CPX-

1204 (<u>drawing 14</u>)], i.e., <u>drawing 15</u> , the bit 7 in <u>drawing 16</u> , and a bit 8 are described.

[0095] The screen size as which ext1204_screen_size_code is specified by the bit 7 and bit 8 of WORD2 of <u>drawing 18</u> is described.

[0096] The value of the screen location specified by the bit 9 and bit 10 of WORD2 which shows ext1204_screen_position_code to <u>drawing 17</u> and <u>drawing 19</u> is described.

[0097] ext1204_subtitle_position_upper and ext1204_subtitle_position_lower express the Rhine location of the upper limit of <u>drawing 22</u> , the maximum upper limit of the title of a lower limit, or the lowest edge, respectively.

[0098] Although various kinds of recognition signals (additional information) shown in <u>drawing 34</u> were recorded on PSM in the above example [1st], it is not PSM but User of Video_Layer. It can record on Data.

[0099] Namely, Video specified by MPEG 2 as shown in <u>drawing 37</u> In Syntax, extensions_and_user_data (2) is prepared following picture_header() and picture_coding_extension(). Along with Syntax of this extensions_and_user_data, a required recognition signal can be encoded and described as follows.

[0100] That is, in Syntax of User_data specified by MPEG, as it is shown in <u>drawing 38</u> , it is made as [specify / user_data]. Then, according to this convention, as shown in <u>drawing 39</u> , user_data is described. The contents described here are the same as the contents described to dvd_video_descriptor substantially shown in <u>drawing 34</u> .

[0101] In addition, in <u>drawing 39</u> , marker_bit() is data in 8 bits of 11111111, and it is inserted in order to prevent what unique data, such as user_data_start_code, are generated for (an emulation is caused), when the data of order are put together.

[0102] Next, the example of the recording device which records the multiplexing data on the disk as a record medium is explained with reference to <u>drawing 40</u> as an example of the equipment multiplexed and transmitted to the digital video image data of the image with which the recognition signal (additional information) was compressed by the MPEG method as mentioned above, and amendment of an aspect ratio was made.

[0103] In this recording apparatus, the audio encoder 102 carries out compression coding of the audio signal inputted into the audio input by the MPEG method, and is outputting to multiplexer 113. Moreover, the video encoder 101 carries out compression coding of the video signal inputted into the video input by the MPEG method, and is outputting it to multiplexer 113. In this case, the stream outputted from the audio encoder 102 is made into an MPEG 2 audio stream (audio layer), and let the stream outputted from the video encoder 101 be the MPEG 2 video stream (video layer) shown in <u>drawing 27</u> (C).

[0104] moreover, the video encoder 101 is fundamentally made as [encode / the image of the aspect ratio of 4:3] -- having — **** — 16:9 and 14: — as explained with reference to <u>drawing 46</u> , the image of wide aspect ratios, such as 9 and 2:1, is in letter box mode or squeeze mode, and after it processes aspect ratio amendment, it

presupposes that it is inputted into the video encoder 101.

[0105] Multiplexer 113 packet-izes an MPEG video stream and an MPEG audio stream, and as shown in <u>drawing 27</u> (A), they carry out time-division multiplexing.

[0106] In addition, although illustration is not carried out, it supplies a subtitle stream to multiplexer 113, and can multiplex it with a video stream and an audio stream. In this case, MPEG 2 system stream outputted from multiplexer 113 will contain a subtitle packet besides a video packet and an audio packet, as shown in <u>drawing 27</u> (A).

[0107] In addition, although multiplexer 113 forms the field of PSM (reservation), it will multiplex by making it into a null there for the time being (actual data (additional information) are written in in the PSM data address circuit 155).

[0108] The output of the entry point detector 131 is supplied to the entry point data store circuit 133. The entry point data store circuit 133 memorizes reception and this for the information on the entry point which the entry point detector 131 detects and outputs (information on the generating point of I picture).

[0109] Although the TOC data generating circuit 156 looks at the contents of storage of the entry point data store circuit 133 and TOC (Table Of Contents) information is generated, the name of a disk, the name of each chapter, the starting address on the disk of each chapter, the playback duration of a disk, the playback duration of each chapter, the starting address of each entry sector, etc. are included in TOC information.

[0110] Once the multiplexing stream outputted from the multiplexing circuit 113 is memorized by DSM (Digital Storage Media)110, it is read from DSM110 and supplied to the TOC addition circuit 150. The TOC addition circuit 150 adds the TOC information which the TOC data generating circuit 156 generated to the multiplexing stream supplied from DSM110, and outputs it to the PSM data address circuit 155.

[0111] The generating circuit 157 generates the PSM data (dvd_video_descriptor) shown in <u>drawing 34</u> mentioned above from the output of the video encoder 101, and outputs this to the PSM data address circuit 155. The PSM data address circuit 155 overwrites PSM data to the field of the entry sector for writing in the PSM data in the multiplexing stream secured with multiplexer 113.

[0112] The output of the PSM data address circuit 155 is supplied to the sector header addition circuit 151, a multiplexing stream is divided for every sector in there, and a sector header is added for every sector. The data with which the sector header was added are inputted into the ECC (error detection correction) encoder 152 by the sector header addition circuit 151, and encoding processing for error detection correction is performed.

[0113] The data outputted from the ECC encoder 152 are inputted into a modulation circuit 153, an EFM (Eight to Fourteen Modulation) modulation is carried out, and the modulation output is transmitted to a transmission line. The cutting machine 154 is supplied in this example.

[0114] In the cutting machine 154, corresponding to the data inputted from the modulation circuit 153, it is forming a pit in a disk 160, and multiplexing stream data are recorded. And DVD (Digital Video Disk) as many replicas is manufactured by making this disk 160 into original recording.

[0115] Drawing 41 expresses the example of a configuration of the regenerative apparatus which plays the optical disk 1 as a DVD generated as mentioned above. The optical disk 1 is controlled by the spindle motor which is not illustrated to rotate at a predetermined engine speed, and the digital data by which compression processing was carried out with the MPEG method currently recorded on the truck is read by irradiating a laser beam on the truck of an optical disk 1 from pickup 2. This digital data is inputted into a demodulator circuit 3, and after an EFM recovery is carried out, it is supplied to the sector appearance circuit 4. Moreover, the output of pickup 2 is inputted into the phase locked loop (PLL) circuit 9, and a clock is reproduced. This playback clock is supplied to a demodulator circuit 3, the sector appearance circuit 4, etc.

[0116] Although it is recorded on the optical disk 1 as a multiplexing stream shows drawing 27 (A) by making a fixed-length sector into a unit, at the head of each sector, the sector header is arranged and the sector sink is added to this sector header. The sector appearance circuit 4 is detecting this sector sink, and detects the break of a sector. Moreover, the sector appearance circuit 4 detects a sector address, and supplies it to a control circuit 6 and the track jump judging circuit 7.

[0117] Moreover, the data which a demodulator circuit 3 outputs are inputted into the ECC (error detection correction) circuit 33 through the sector appearance circuit 4, and detection correction processing of an error is performed. The data with which processing of error detection correction was performed are written in the ring buffer memory 5 under control of a control circuit 6.

[0118] The output of the ECC circuit 33 is inputted into the PSM detector 40 again. From the inputted stream data, the PSM detector 40 detects the PSM information in an entry sector (additional information), and outputs the detected PSM information to a control circuit 6. A control circuit 6 controls a signal generator 51 corresponding to this PSM information. A signal generator 51 generates the recognition signal supplied to the display 18 of the aspect ratio of 16:9 corresponding to this control. This recognition signal is inserted in the 20th line of the perpendicular blanking period of the analog video signal of NTSC system, and the 283rd line, and D/A converter 17 outputs it to a display 18, as explained with reference to drawing 1 .

[0119] A control circuit 6 specifies the write-in address which writes the data of the sector in the ring buffer 5 with the light pointer WP based on the sector address of each sector supplied from the sector appearance circuit 4. Furthermore, a control circuit 6 specifies the read-out address which reads data for the code from the latter video code buffer 10 from the ring buffer 5 based on a request signal with the lead pointer RP. The data read from the location of the lead pointer RP are made as

[supply / a demultiplexer 32].

[0120] The focus servo circuit 25 generates a focal error signal from the output of pickup 2, and is made as [perform / a focus servo] corresponding to this focal error signal. Similarly, corresponding to the tracking error signal which pickup 2 outputs, the tracking servo circuit 8 controls pickup 2, and is made as [perform / a tracking servo].

[0121] Corresponding to the command from a control circuit 6, the track jump judging circuit 7 supplies a track jump command signal to the tracking servo circuit 8 to predetermined timing, and is made as [make / a predetermined truck / carry out high-speed migration (jump) of the pickup 2].

[0122] A user interface 31 is operated when a user inputs a predetermined command, and it is made as [input / into a control circuit 6 / the command corresponding to the actuation].

[0123] Since the data currently recorded on the optical disk 1 are made into the coded data which multiplexed a video data, audio data, subtitle data, etc., a demultiplexer 32 separates these data from the data supplied from the ring buffer 5, supplies them to the audio decoder and subtitle decoder which do not illustrate audio data and subtitle data, and supplies a video data to the video code buffer 10 of the video decoder 20.

[0124] As for the data memorized by the video code buffer 10, the part is supplied to the picture header detector 34. The picture header detector 34 detects a picture header from the inputted data, and detects the type information which shows the type of I, P, and B of a picture further from this picture header, and the information on a temporal RIFA lance (TR) which shows the order of a screen in GOP. The detected picture type information is further supplied to the picture data sorting circuit 35. At the time of special playback, the picture data sorting circuit 35 sorts out only I picture and P picture, and it controls them so that the reverse VLC circuit 11 is supplied from the video code buffer 10.

[0125] Usually, it controls to supply the picture of all types to the reverse VLC circuit 11 from the video code buffer 10, without the picture data sorting circuit 35 sorting out a picture with a picture type at the time of playback.

[0126] The data supplied to the reverse VLC circuit 11 are supplied to the reverse quantization circuit 12, after reverse VLC processing is performed there. Moreover, the reverse VLC circuit 11 receives a new data transfer for a code request signal in the video code buffer 10 from delivery and the video code buffer 10 at this time.

[0127] Moreover, the reverse VLC circuit 11 outputs motion vector information to the motion compensation circuit 15 while outputting a quantization step size to the reverse quantization circuit 12. The reverse quantization circuit 12 reverse-quantizes the data supplied from the reverse VLC circuit 11 corresponding to the quantization step size supplied from the reverse VLC circuit 11, and supplies them to the reverse DCT circuit 13. After the reverse DCT circuit 13 carries out reverse DCT processing

of the inputted data, it is outputted to an adder circuit 14.

[0128] An adder circuit 14 adds the output of the reverse DCT circuit 13, and the output of the motion compensation circuit 15 according to the type (I, P, B) of a picture, and outputs them to the frame memory bank 16.

[0129] The frame memory bank 16 chooses as 16a, 16b, or 16c three frame memories 16a, 16b, and 16c and the memory which is equipped with the switches 16d and 16e which switch the I/O, and writes in data by switch 16d, and switches the memory to read to 16a, 16b, or 16c by switching switch 16e. After the image of each frame which carried out decoding is returned in order of the original frame by this, it is made as [supply / D/A converter 17]. Moreover, suitably, the data read from the frame memory banks 16a, 16b, and 16c are supplied to the motion compensation circuit 15, and are made as [supply / an adder circuit 14] as motion prediction data.

[0130] D/A converter 17 contains the NTSC encoder or the PAL encoder, changes into the analog video signal of NTSC system or a PAL system the digital image data supplied from switch 16e, and is made as [output / to a display 18].

[0131] Next, corresponding to the detected PSM information, the actuation which controls an aspect ratio amendment condition is explained. Pickup 2 reproduces the data currently recorded on the optical disk 1, and outputs them to a demodulator circuit 3. A demodulator circuit 3 carries out the EFM recovery of the inputted playback data, and outputs them to the ECC circuit 33 through the sector appearance circuit 4. After the ECC circuit 33 performs error detection correction processing of the inputted data, it is supplied and recorded on the ring buffer 5.

[0132] The data read from the ring buffer 5 are inputted into a demultiplexer 32, and a demultiplexer 32 separates subtitle data and audio data from the inputted data, and outputs them to a subtitle decoder and an audio decoder, respectively. Moreover, a video data is separated and it outputs to the video code buffer 10.

[0133] The data memorized by the video code buffer 10 are further supplied to the reverse VLC circuit 11, after reverse VLC processing is carried out, it reverse-quantizes in the reverse quantization circuit 12, and reverse DCT processing of them is carried out further in the reverse DCT circuit 13. After the data outputted from the reverse DCT circuit 13 run by the data which the motion compensation circuit 15 outputs and are guaranteed by them in an adder circuit 14, they are written in either frame memory 16a thru/or 16c through switch 16d.

[0134] After the data written in frame memory 16a thru/or 16c are read in order of the original frame through switch 16e and are changed into the analog video signal of NTSC system in D/A converter 17, they are outputted and displayed on the display 18 of the aspect ratio of 16:9.

[0135] On the other hand, the PSM detector 40 detects PSM information from the data which the ECC circuit 33 outputs, and outputs it to a control circuit 6. A control circuit 6 outputs the control signal corresponding to the inputted PSM information to a signal generator 51. A signal generator 51 generates a predetermined recognition

signal corresponding to this control signal, and outputs it to D/A converter 17. This signal is a signal corresponding to the contents of dvd_video_descriptor shown in drawing 34 mentioned above.

[0136] When the wide television receiver 80 which has CRT85 of the aspect ratio of 16:9 as shown in drawing 47 as a display 18 is connected, the horizontal filter 82 and the perpendicular direction filter 83 are formed in the interior of this television receiver 80. Then, if a signal generator 51 outputs PSM information to D/A converter 17, D/A converter 17 will be inserted on the 20th line and the 283rd line, as this PSM information was explained with reference to drawing 1 (drawing 1). And this signal is supplied to a television receiver 80.

[0137] In a television receiver 80, as shown in drawing 47 , it is the television signal demodulator circuit 81, and a video signal and a recognition signal are separated, and a video signal is outputted and displayed on CRT85 through the horizontal filter 82 and the perpendicular direction filter 83. Moreover, a recognition signal is extracted and is supplied to a controller 84. A controller 84 controls the horizontal filter 82 and the perpendicular direction filter 83 corresponding to this extracted recognition signal.

[0138] It follows, for example, the recognition signal showing whether it is data by which aspect amendment processing was carried out in squeeze mode into amendment information as the recognition signal showing whether it is data by which aspect amendment processing was carried out in letter box mode as picture frame information, or aspect ratio information is included. When other recognition signals (namely, recognition signal of normal mode) which are not in letter box mode, either and are not in squeeze mode, either are supplied, a controller 84 turns on the horizontal filter 82 and makes the perpendicular direction filter 83 turn off. Thereby, as it was indicated in (D) as drawing 48 (A), a blacking wash part is added to right and left of the screen of the aspect ratio of 4:3, and the screen of the aspect ratio of 16:9 is displayed on CRT85 of the aspect ratio of 16:9 as a whole.

[0139] Moreover, it sets, when it is the image in letter box mode, and a controller 84 turns off the horizontal filter 82 and turns on the perpendicular direction filter 83. Thereby, as it is indicated in (E) as drawing 48 (B), only an effective image field is extracted by the perpendicular direction filter 83, and is displayed on CRT85 as a screen of the aspect ratio of 16:9.

[0140] Moreover, when it is in squeeze mode, a controller 84 turns off both the horizontal filter 82 and the perpendicular direction filter 83. Consequently, as it is indicated in (F) as drawing 48 (C), in CRT85 of the aspect ratio of 16:9, it is elongated horizontally, and the image which was compressed horizontally and made into the aspect ratio of 4:3 is displayed as a usual image of the aspect ratio of 16:9.

[0141] Moreover, when the signal which specifies the location and title location of an effective image field as shown in PSM information at drawing 17 thru/or drawing 22 , for example is included, a television receiver generates a signal so that a title may not be missing, and Rhine which should be displayed can be extracted.

[0142] For example, as shown in drawing 24 , the blacking wash part is added up and down, and it considers as the thing of a screen by which the title is arranged at the blacking wash part of the bottom of them. In such a case, if it is made to make it display except for the blacking wash part which contained the up-and-down title to the display 18, when all or a part of the title will be missing, the signal which includes range information with a signal generator 51 is generated, and it transmits to a television receiver with D/A converter 17 so that the perpendicular filter 83 of a television receiver can extract the range from Rhine of the maximum upper limit of a usual picture area field to Rhine of the lowest edge of a title.

[0143] Or as shown in drawing 25 , when a title exists in both up-and-down blacking wash parts again, the signal which includes range information with a signal generator 51 is generated, and it is made to transmit to a television receiver with D/A converter 17 so that the perpendicular filter 83 can extract the range to Rhine of the lower limit of a lower title from Rhine of the maximum upper limit of an upper title. If it does in this way, it will be controlled substantially that some images are missing.

[0144] The optical disk 1 which recorded in digital one the image with which it was compressed as mentioned above, and aspectual amendment was made can be played, and it can be made to display it as the case where it records the account of an analog, similarly.

[0145] In the example of drawing 41 , although the horizontal filter and the perpendicular direction filter considered as the configuration which is not built in the optical disk regenerative apparatus 50, it can consider as the configuration which makes the same filter build in a regenerative apparatus, taking connecting 4:3 usual displays into consideration. That is, the video signal outputted from demulti PURESA 32 is supplied to the video decoder 20, and it is made to make the video data outputted from the video decoder 20 output to a display 18 through the horizontal filter 61 and the perpendicular direction filter 62, as shown in drawing 42 . And the PSM information which the PSM detector 40 detected is supplied to a control circuit 6, and it is made to make a control circuit 6 control the horizontal filter 61 and the perpendicular direction filter 62 corresponding to this PSM information.

[0146] In this case, as a display 18, display 18A like a wide television receiver (namely, television receiver 80 shown in drawing 47) which has the aspect ratio of 16:9 can also be connected, or display 18B of the television receiver of the usual NTSC system which has the aspect ratio of 4:3 can be connected again.

[0147] Drawing 43 expresses the detailed example of a configuration rather than it can set in this case. As shown in this drawing, in this example, the video data outputted from the frame memory bank 16 is made as [supply / through the horizontal filter 61 and the perpendicular direction filter 62 / D/A converter 17]. And the horizontal filter 61 and the perpendicular direction filter 62 are made as [control / corresponding to the control signal outputted from the control circuit 6]. Other configurations are the same as that of the case in drawing 41 .

[0148] In this example, the display (television receiver) 18 which the user connected to the optical disk regenerative apparatus 50 orders a control circuit 6 whether it is the thing of the aspect ratio of 16:9, and whether to be the thing of the aspect ratio of 4:3 from a user interface 31. This command is performed by switching the predetermined switch (prepared as a user interface 31) set up beforehand.

[0149] When the display 18 connected to this optical disk regenerative apparatus 50 is display 18A of the aspect ratio of 16:9, a control circuit 6 turns off the horizontal filter 61 and the perpendicular direction filter 62. Therefore, substantially, it becomes the same configuration as the example shown in drawing 41 , and the same actuation as the example shown in drawing 41 is performed in this case.

[0150] Display 18B which has the aspect ratio of 4:3 has neither the horizontal filter nor the perpendicular direction filter. Then, a control circuit 6 controls as follows the horizontal filter 61 and the perpendicular direction filter 62 which are built in when display 18B which has the aspect ratio of 4:3 is connected as a display 18.

[0151] That is, when it is the image of normal mode, both the horizontal filter 61 and the perpendicular direction filter 62 are turned off. Consequently, a normal image is displayed on display 18B of the aspect ratio of 4:3.

[0152] When it is the image in letter box mode, a control circuit 6 turns off the horizontal filter 61 and the perpendicular direction filter 62 both. Consequently, a blacking wash part is added up and down, and the image with which the whole was adjusted to the aspect ratio of 4:3 is displayed on display 18B.

[0153] Moreover, when the image in squeeze mode is reproduced, a control circuit 6 controls the horizontal filter 61 and the perpendicular direction filter 62 to be shown in drawing 44 . That is, a control circuit 6 turns on the horizontal filter 61, and makes the perpendicular direction filter 62 turn off fundamentally. Consequently, some images horizontally compressed with the horizontal filter 61 are cut down, it is elongated horizontally, and an image is displayed on display 18B of the aspect ratio of 4:3 in edge crop mode.

[0154] In this edge crop mode, as shown in drawing 44 , some images (image of a right-and-left edge) of an effective image field will be missing. For this reason, the display in edge crop mode may be forbidden from viewpoints, such as copyright. When prohibition of a display in this edge crop mode is specified as edge_crop_flag, a control circuit 6 turns off the horizontal filter 61, and turns on the perpendicular direction filter 62.

[0155] The perpendicular direction filter 62 compresses perpendicularly the image in the squeeze mode compressed horizontally, changes it into the image of a normal ratio, further, adds a blacking wash part to the edge of the upper and lower sides of the effective image field, and, on the whole, uses it as the image of the aspect ratio of 4:3. That is, the image in letter box mode is generated. And the image in this letter box mode is outputted and displayed on display 18B of the aspect ratio of 4:3.

[0156] In the condition that the display in letter box mode is performed, when the

command in edge crop mode is inputted, a control circuit 6 turns off the perpendicular direction filter 62, turns on the horizontal filter 61, and performs the display in edge crop mode, because a user operates manually. However, as mentioned above, when the display in this edge crop mode is forbidden, it is made, as for a control circuit 6, not to receive this manual command.

[0157] The switch by the manual operation from edge crop mode to a letter box is possible similarly.

[0158] In changing the aspect ratio of an image using a level perpendicular filter within the above-mentioned regenerative apparatus, a control circuit 6 controls so that the information generated with a signal generator 51 expresses the condition of the aspect ratio of the image after each filtering. Although it is directed by the user interface 31 that the display of 4:3 is connected to a regenerative apparatus by doing in this way, when the display of 16:9 is connected in fact, it becomes possible at least to display by the right aspect ratio as a result.

[0159] It sets in the above example and is System considering additional information as a part of recognition signal. It is MPEG although it was made to encode to PSM of layer. System Private defined by layer It can encode as Packet. Or it is Group in encoding as a part of extensions_and_user_data (0) which collects for every Sequence and follows Sequence_header again ****. of It collects for every Picture and is Group. of It is made to encode as a part of extensions_and_user_data (1) following Picture_header, or you may make it encode as a part of extensions_and_user_data (2) for every Picture. It collects into every record medium (optical disk), and as previously indicated to Japanese Patent Application No. 7-61411, it can record on the TOC field arranged in the specific location of a disk further again.

[0160] Although the example of the above-mentioned regenerative apparatus described NTSC, the same effectiveness can be acquired by using the WSS signal mentioned above also about the PAL system instead of CPX-1204 and the extended edition of those.

[0161] For drawing 45 , XDS is MPEG as previously indicated to Japanese Patent Application No. 7-6902. System Private defined by layer The example of a configuration of the optical disk regenerative apparatus in the case of being recorded on Stream is expressed. As shown in this drawing, in this example, a private stream is separated by the demultiplexer 32 and the private stream (XDS signal) decoder 71 is supplied.

[0162] The private stream decoder 71 decodes a XDS signal from the inputted private stream, and outputs it to XDS signal modification equipment 72. As shown in drawing 47 , when a display 18 has the horizontal filter 82 and the perpendicular direction filter 83, as mentioned above, the processing in the horizontal filter 61 and the perpendicular direction filter 62 of the optical disk regenerative apparatus 50 becomes unnecessary. However, in changing an aspect ratio with the level perpendicular filters 61 and 62, XDS signal modification equipment 72 outputs the result of having changed

and changed this XDS signal to the XDS signal generator 73 according to the aspect ratio of the output image from both filters corresponding to the command from a control circuit 6. The XDS signal generator 73 generates the XDS signal corresponding to the input from XDS signal modification equipment 72, and outputs it to D/A converter 17. D/A converter 17 inserts the inputted XDS signal in the 21st line and the 284th line, and outputs it to a display 18.

[0163] Thus, also in this example, the same processing as the case where the recognition signal has been arranged to PSM can be performed.

[0164] Moreover, CPX-1202 signal can also be generated like the above-mentioned regenerative-apparatus example by making a signal generator 51 and D/A converter 17 into CPX-1202. Moreover, the timing information which shows the time of day when these amendment information becomes effective is recorded with amendment information, and it can transmit to a display 18 based on the time of day. Though PTS (Presentation Time Stamp) and DTS (Decoding Time Stamp) which are specified by MPEG are recorded as this timing information, for example, it is good, and in using PSM, suppose that SCR in the pack header set just before PSM (System Clock Reference) is used.

[0165] In addition, in the above-mentioned example, although the multiplexed data are recorded on a record medium and this was reproduced with the regenerative apparatus, it is also possible to transmit to a remote place, to receive this through a network, and to make it use.

[0166]
[Effect of the Invention] According to the regenerative apparatus and approach of this invention, since addition formal information was superimposed on the blanking period according to image formal information and copy control information, when the outputted equipment has the filter which performs a perpendicular direction or horizontal processing, it becomes possible to see an image in the state of the right.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing explaining the transmission wave of the recognition signal in CPX-1204 specification.
[Drawing 2] It is drawing explaining the configuration of the bit transmitted by the wave of drawing 1 .
[Drawing 3] It is drawing explaining the contents of the bit of WORD0 of drawing 2 .
[Drawing 4] It is drawing explaining the transmission wave of the recognition signal in WWS.

[Drawing 5] It is drawing explaining the contents of the bit transmitted by the wave of drawing 4 .

[Drawing 6] It is drawing explaining the detail of the aspect ratio information of the group 1 of drawing 5 .

[Drawing 7] It is drawing showing the example of a display in a letter box.

[Drawing 8] Aspect of drawing 6 ratio It is drawing explaining the detail of label.

[Drawing 9] It is drawing explaining the detail of Camera/Film of the bit 4 of the group 2 of drawing 5 .

[Drawing 10] It is drawing explaining the contents of the bit 8 of the group 3 of drawing 5 .

[Drawing 11] It is drawing explaining the contents of the bit 9 of the group 3 of drawing 5 , and the bit 10.

[Drawing 12] It is drawing explaining the bit pattern of extended CPX-1204.

[Drawing 13] It is drawing explaining the contents of the bit of WORD0 of drawing 12 .

[Drawing 14] It is drawing explaining the contents of WORD1 of drawing 12 .

[Drawing 15] It is drawing explaining the contents of WORD2 in case WORD1 of drawing 12 is 0000.

[Drawing 16] It is drawing explaining the contents of the bits 7 and 8 of drawing 15 .

[Drawing 17] It is drawing explaining the contents of WORD2 in case WORD1 of drawing 12 is 0001.

[Drawing 18] It is drawing explaining the contents of the bits 7 and 8 of drawing 17 .

[Drawing 19] It is drawing explaining the contents of the bits 9 and 10 of drawing 17 .

[Drawing 20] It is drawing explaining the contents of WORD2 in case WORD1 of drawing 12 is 0010.

[Drawing 21] It is drawing explaining the contents of the bit 7 of drawing 20 .

[Drawing 22] It is drawing explaining the contents of the bit 8 of drawing 20 thru/or the bit 14.

[Drawing 23] It is drawing explaining the contents of the recognition signal in XDS.

[Drawing 24] It is drawing explaining a title location.

[Drawing 25] They are other drawings explaining a title location.

[Drawing 26] It is drawing explaining the configuration of a program stream.

[Drawing 27] It is drawing explaining the contents of data of an MPEG 2 system stream.

[Drawing 28] It is drawing explaining the configuration of an entry sector.

[Drawing 29] It is drawing explaining the configuration of a program stream map.

[Drawing 30] It is drawing showing syntax of the program stream map of drawing 29 .

[Drawing 31] It is drawing explaining syntax of global_descriptors of drawing 30 .

[Drawing 32] elementary of drawing 30 stream It is drawing showing syntax of descriptors.

[Drawing 33] It is drawing showing tag of descriptors.

[Drawing 34] It is drawing explaining syntax of dvd_video_descriptor.

[Drawing 35] It is drawing showing aspect_ratio_code.
[Drawing 36] It is drawing explaining frame_ratio_code.
[Drawing 37] video It is drawing explaining syntax.
[Drawing 38] It is drawing explaining syntax of user_data.
[Drawing 39] It is drawing explaining user_data().
[Drawing 40] It is the block diagram showing the configuration of one example of the image data recorder of this invention.
[Drawing 41] It is the block diagram showing the example of a configuration of the optical disk regenerative apparatus which applied this invention.
[Drawing 42] It is the block diagram showing other examples of a configuration of the optical disk regenerative apparatus of this invention.
[Drawing 43] It is the block diagram showing the more detailed example of a configuration of the example of drawing 42 .
[Drawing 44] It is drawing explaining actuation of the example of drawing 43 .
[Drawing 45] It is the block diagram showing other examples of a configuration of the optical disk regenerative apparatus which applied this invention.
[Drawing 46] It is drawing explaining the relation between an aspect ratio and record.
[Drawing 47] It is the block diagram showing the example of a configuration of the conventional wide television receiver.
[Drawing 48] It is drawing explaining actuation of the example of drawing 47 .
[Drawing 49] It is drawing showing the display position of an effective image field.
[Drawing 50] It is drawing showing the display position of a title.
[Description of Notations]
1 Optical Disk 2 Pickup, 4 Sector appearance circuit 5 A ring buffer, 6 Control circuit 8 A tracking servo circuit, 10 Video code buffer 16 frame memory bank 17 A D/A converter, 18 display 20 A video decoder, 32 Demultiplexer 40PSM detector, 61 Horizontal filter 62 A perpendicular direction filter, 51 Signal generator 71 Private stream decoder 72 XDS signal modification equipment 73 XDS signal generator 81 A television signal demodulator circuit, 82 Horizontal filter 83 Perpendicular direction filter 85 CRT